

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF THE CLAIMS

1. (currently amended) For a network of interconnected ~~business-processes~~ associated with operation of a fossil fuel power plant, a method for assigning credit to a first input of a first process of the fossil fuel power plant with respect to a global output of the network indicative of a profit generated by the fossil fuel power plant, the first process having a plurality of inputs and outputs, at least one of said outputs being a chained output that is an input to a second process of the fossil fuel power plant in the network and contributes to the global output, the method comprising:

obtaining a credit assignment for each of the chained outputs of the first process of the fossil fuel power plant with respect to the global output of the network indicative of the profit generated by the fossil fuel power plant;

using a first-order differentiable model of the first process of the fossil fuel power plant to derive a local credit assignment for the first input; and

applying a chain rule for ordered partial derivatives using the first-order differentiable model, the local credit assignment for the first input, and the credit assignments for the chained outputs of the first process with respect to the global output to assign credit to the first input with respect to the global output of the network.

2. (original) The method of claim 1, wherein the first-order differentiable model is a neural network.

3. (original) The method of claim 1, wherein the first-order differentiable model is a first-principles model.

4. (original) The method of claim 1, wherein the first process is managed by a first process management module and the first process management module determines the credit assignment of the first input.

5. (original) The method of claim 1, wherein the first process is managed by a first process management module and the first process management module transmits the local credit assignment over a network to a second program that computes the credit assignment for the first input.

Claims 6-17 (canceled)

18. (currently amended) A computer program product residing on a computer readable medium for use in analyzing a first ~~business process of a fossil fuel power plant~~, the first process having a plurality of inputs and at least one output, at least one of said outputs being a chained output that is an input to a second process in the network and contributes to ~~the a~~ global output indicative of a profit generated by the fossil fuel power plant, the computer program product containing instructions for causing a computer to:

obtain a credit assignment for each of the chained outputs of the first process of the fossil fuel power plant with respect to the global output indicative of the profit generated by the fossil fuel power plant using an application program interface;

obtain a first-order-differentiable model of the first process of the fossil fuel power plant; and

apply a chain rule for ordered partial derivatives to the first-order-differentiable model using the credit assignments for the chained outputs of the first process with respect to the global output to determine a credit of the first input with respect to the global output.

19. (original) The computer program product of claim 18, wherein the first-order-differentiable model is a neural network.

20. (original) The computer program product of claim 18, wherein the first-order-differentiable model is a first-principles model.

Claim 21 (canceled)

22. (original) The computer program product of claim 18, wherein the first-order-differentiable model can be adapted.

Claim 23 (canceled)

24. (new) The method of claim 1, wherein said first and second processes of the fossil fuel power plant are selected from the group consisting of the following processes: combustion optimization, sootblowing optimization, boiler performance optimization, selective catalytic reduction (SCR) optimization, flue gas desulfurization (FGD) optimization, and profit optimization.

25. (new) The method of claim 1, wherein the first process is combustion optimization, said first input selected from the group consisting of: O₂ trim, over fire air (OFA), mill biases, SAD, and cleanliness; and an output of the first process is selected from the group consisting of: boiler losses, boiler NO_x and boiler SO_x.

26. (new) The method of claim 1, wherein the first process is sootblowing optimization, said first input selected from the group consisting of: location, pressure and frequency of sootblowing operations; and an output of the first process is selected from the group consisting of: soot losses and cleanliness.

27. (new) The method of claim 1, wherein the first process is SCR optimization, said first input selected from the group consisting of: boiler NO_x and NH₃; and an output of the first process is selected from the group consisting of: SCR losses and NO_x.

28. (new) The method of claim 1, wherein the first process is FGD optimization, said first input selected from the group consisting of: boiler SO_x and limestone; and an output of the first process is selected from the group consisting of: FGD losses and SO_x.
29. (new) The method of claim 1, wherein the first process is boiler performance optimization, said first input selected from the group consisting of: soot losses, cleanliness, boiler losses, SCR losses and FGD losses; and an output of the first process is selected from the group consisting of: heat rate (HR) and MW.
30. (new) The method of claim 1, wherein the first process is managed by a first process management module, wherein the first management module is selected from the group consisting of: a module for optimizing combustion; a module for optimizing sootblowing; a module for optimizing boiler performance; a module for optimizing selective catalytic reduction (SCR); and a module for optimizing flue gas desulfurization (FGD).
31. (new) The method of claim 1, wherein said interconnected processes include a third process that is profit optimization, the third process having a plurality of inputs and an output that is said global output of the network indicative of the profit generated by the fossil fuel power plant.
32. (new) The method of claim 31, wherein an input of said third process is selected from the group consisting of: heat rate (HR), MW, NO_x, NH₃, SO, limestone, emission credits, and fuel costs.
33. (new) The computer program product of claim 18, wherein said first and second processes of the fossil fuel power plant are selected from the group consisting of the following processes: combustion optimization, sootblowing optimization, boiler performance optimization, selective catalytic reduction (SCR) optimization, flue gas desulfurization (FGD) optimization, and profit optimization.

34. (new) The computer program product of claim 18, wherein the first process is combustion optimization, said first input selected from the group consisting of: O₂ trim, over fire air (OFA), mill biases, SAD, and cleanliness; and an output of the first process is selected from the group consisting of: boiler losses, boiler NO_x and boiler SO_x.

35. (new) The computer program product of claim 18, wherein the first process is sootblowing optimization, said first input selected from the group consisting of: location, pressure and frequency of sootblowing operations; and an output of the first process is selected from the group consisting of: soot losses and cleanliness.

36. (new) The computer program product of claim 18, wherein the first process is SCR optimization, said first input selected from the group consisting of: boiler NO_x and NH₃; and an output of the first process is selected from the group consisting of: SCR losses and NO_x.

37. (new) The computer program product of claim 18, wherein the first process is FGD optimization, said first input selected from the group consisting of: boiler SO_x and limestone; and an output of the first process is selected from the group consisting of: FGD losses and SO_x.

38. (new) The computer program product of claim 18, wherein the first process is boiler performance optimization, said first input selected from the group consisting of: soot losses, cleanliness, boiler losses, SCR losses and FGD losses; and an output of the first process is selected from the group consisting of: heat rate (HR) and MW.

39. (new) The computer program product of claim 18, wherein the first process is managed by a first process management module, wherein the first management module is selected from the group consisting of: a module for optimizing combustion; a module for optimizing sootblowing; a module for optimizing boiler performance; a module for optimizing selective catalytic reduction (SCR); and a module for optimizing flue gas desulfurization (FGD).

40. (new) The computer program product of claim 18, wherein said interconnected processes include a third process that is profit optimization, the third process having a plurality of inputs and an output that is said global output of the network indicative of the profit generated by the fossil fuel power plant.

41. (new) The computer program product of claim 40, wherein an input of said third process is selected from the group consisting of: heat rate (HR), MW, NO_x, NH₃, SO, limestone, emission credits, and fuel costs.